Attachment 1

Research Affiliates, LLC

Capital Market Expectations

CalPERS

Investment Committee Meeting

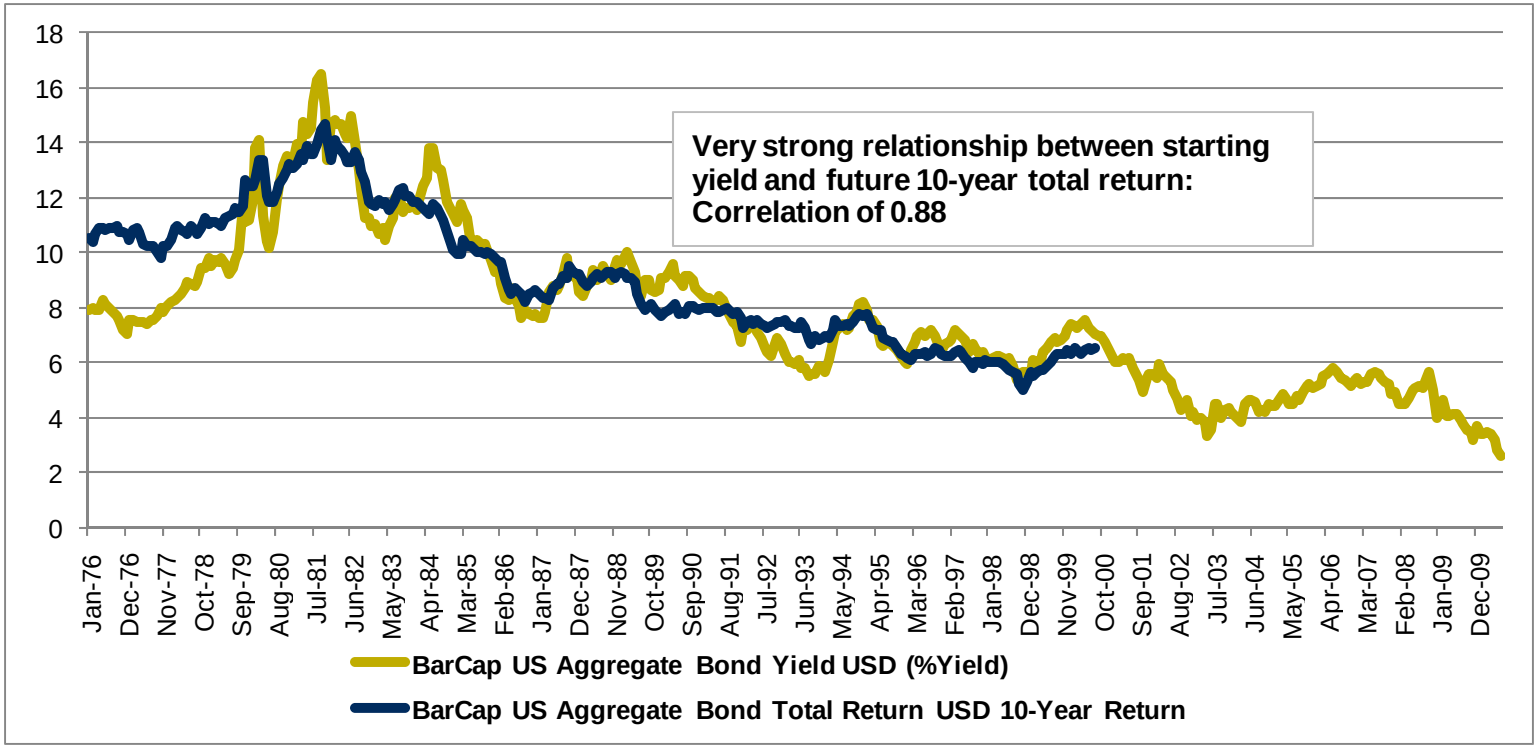
September 13, 2010

CalPERS—Table of Contents

A. How Do We Set Bond and Stock Market Expectations?

Bond Market Returns Follow Yields

Future *long-term* bond returns closely follow entry yield



Source: Research Affiliates, LLC based on data from Ibbotson and Barclays Capital.

Bond Market Returns Follow Yields

30-year returns of Long US Government Bonds: 10.0%!

Should we expect that for the next decade?? No!

Today's yield is under 4% = the only sensible expected future return

Bond Category	Annualized Return	Since Inception of Index	Risk (Standard Deviation)	CURRENT YIELD:
US Aggregate	8.42%	January 1976	6.15%	**2.57%**
US Government	8.05%	January 1973	5.69%	**1.61%**
US Treasury	7.00%	January 1987	5.06%	**1.65%**
US Credit	8.36%	January 1973	7.93%	**3.73%**
US Corp High Yield	9.40%	January 1983	9.64%	**8.34%**
US Government Long	8.83%	January 1973	11.11%	**3.72%**
US Gov't Intermediate	7.75%	January 1973	4.57%	**1.31%**
US Corporate A	8.21%	January 1973	8.12%	**3.80%**
US Corporate Baa	8.93%	January 1973	8.48%	**4.50%**
US Mortgage Backed	8.59%	January 1976	7.31%	**2.59%**

Source: Research Affiliates, LLC based on data from Ibbotson. All returns, risk, and yields (as of July 31, 2010) courtesy of Barclays Capital bond indexes.

Building Blocks for Bonds

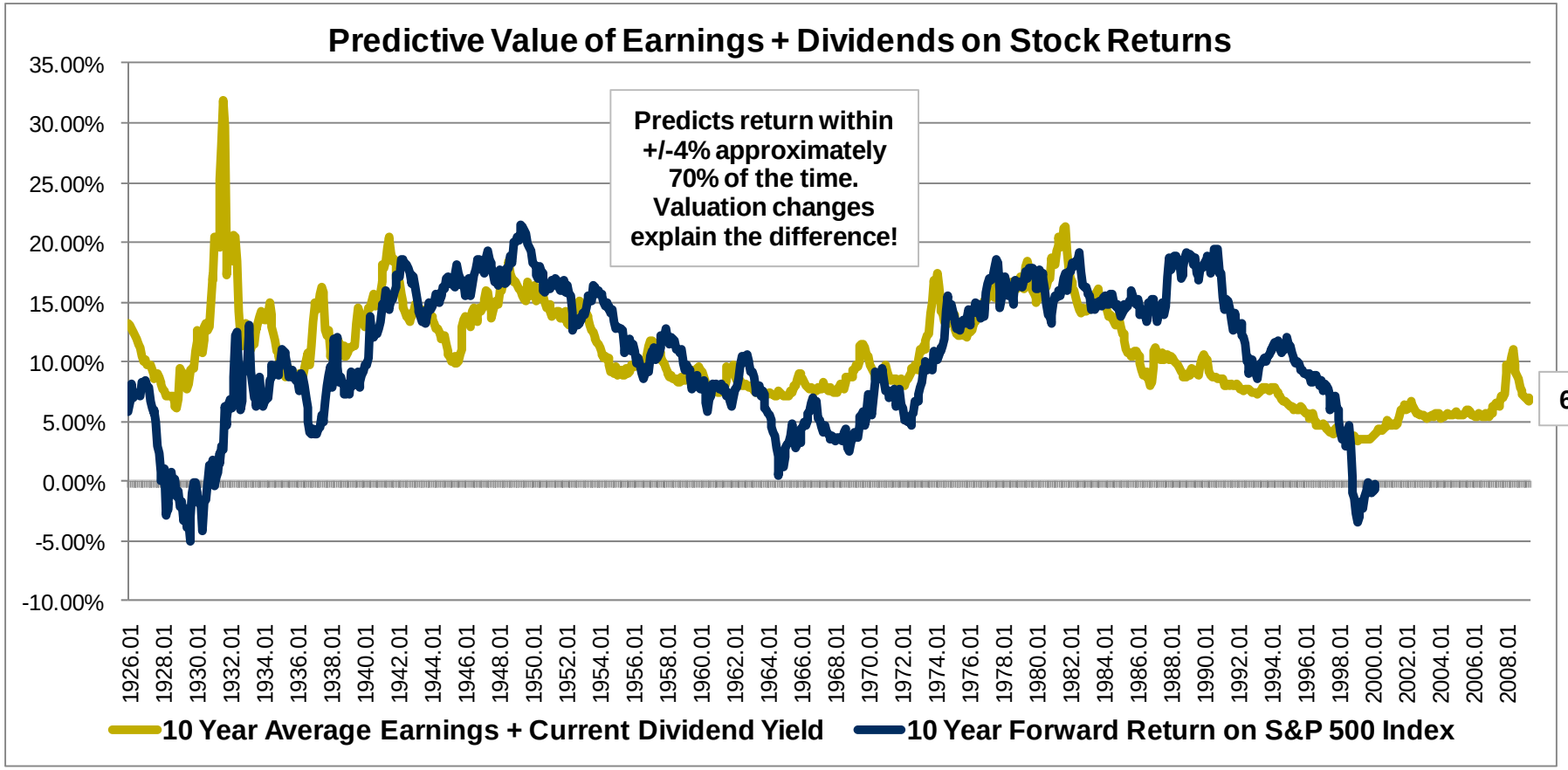
Bond returns are decomposed into 2 parts:

	Expected Return	Methodology
Income (Yield to Maturity)	2.6%	Current YTM (8/2010) of BarCap Aggregate Bond Index
Real Growth (Expected Default Rate)	-0.1%	Expected default rate for BarCap Aggregate Index
NOMINAL EXPECTED RETURN	2.5%	

Source: Research Affiliates, LLC based on data from Bloomberg.

Stock Market Returns Follow Valuation

Future *long-term* returns follow entry earnings growth plus dividend yield and changes in valuation



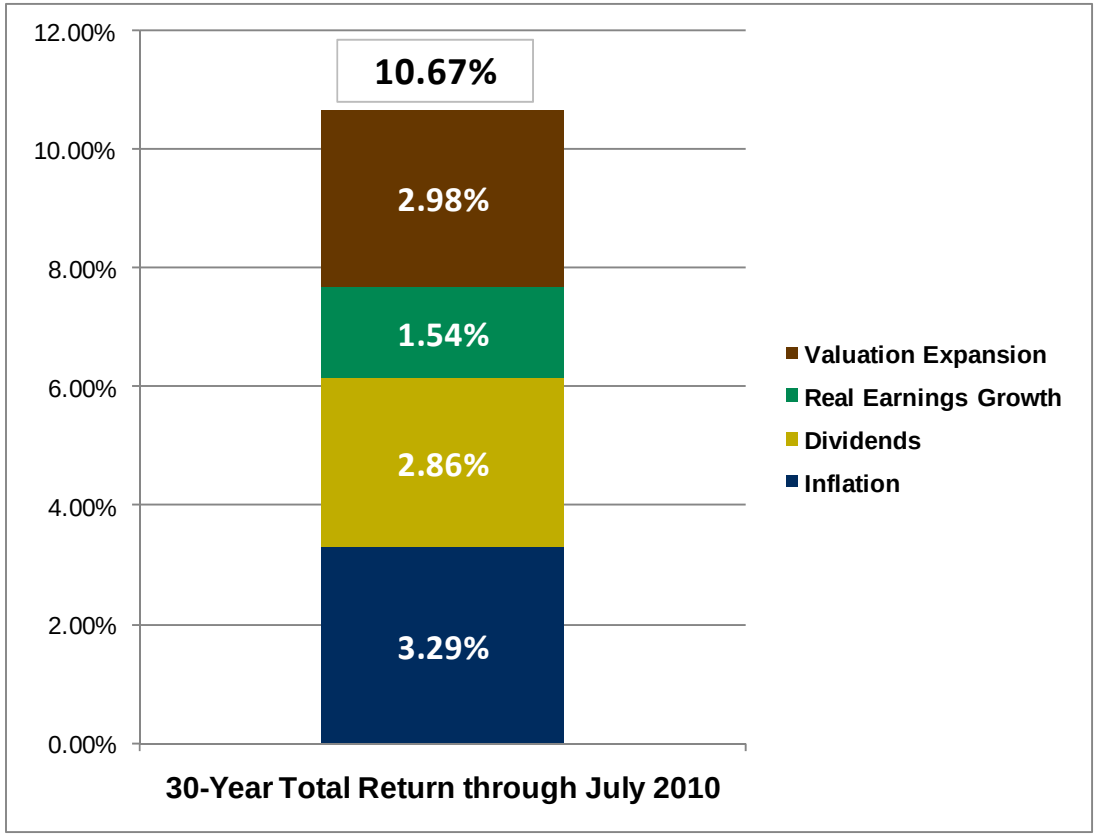
Source: Research Affiliates, LLC based on data from Ibbotson and Robert Shiller of Yale.

Stock Market Returns Follow Valuation

30-year returns of S&P 500 stocks: 10.7%!

Should we expect that for the next decade?? No!

This past period was driven by strong valuation multiple expansion:



Source: Research Affiliates, LLC based on data from Ibbotson and Robert Shiller of Yale.

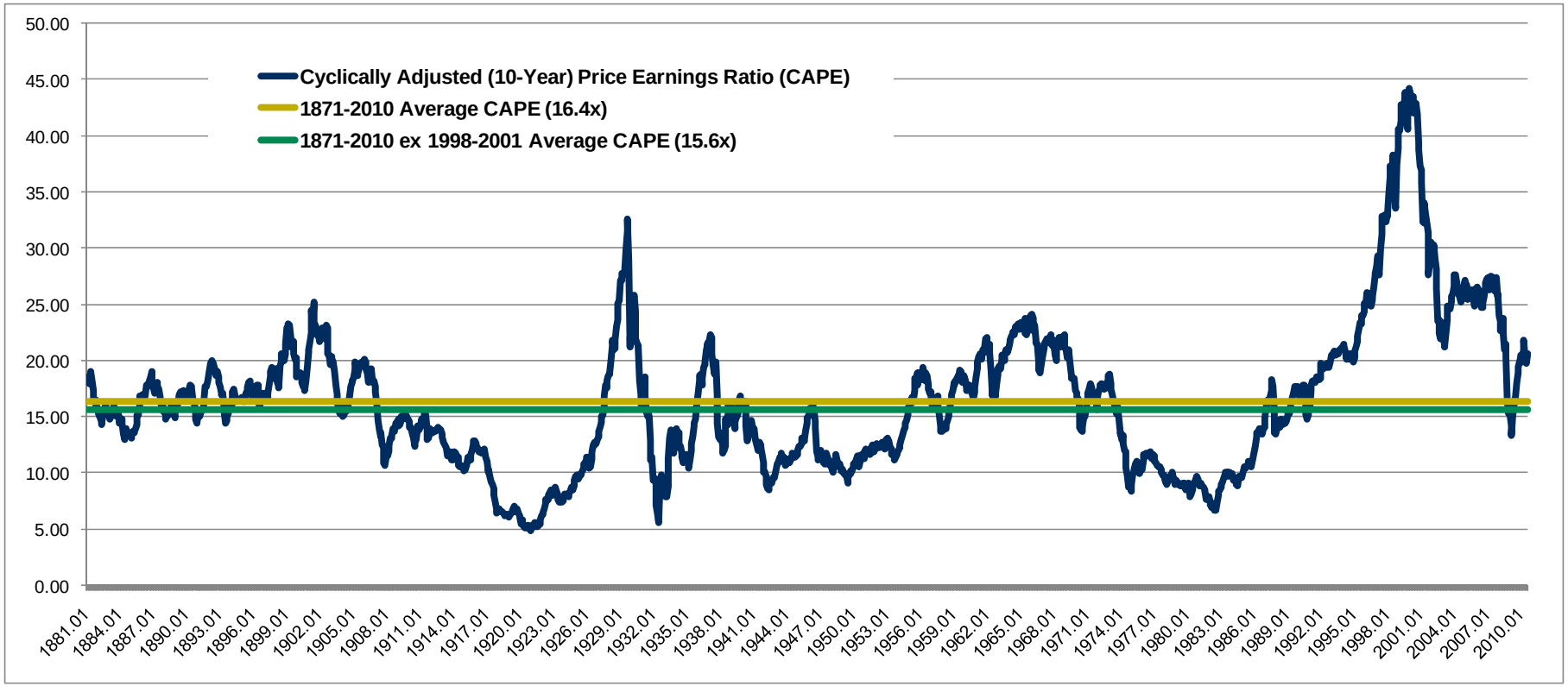
Building Blocks for Stocks

Stock returns are decomposed into 4 parts:

	Expected Return	Methodology
Dividend Yield	2.2%	Current Dividend Yield of S&P 500 Index (8/2000)
Real Earnings Growth	1.5%	100-year average (population and productivity growth)
Expected Inflation	2.0%	10-year Breakeven Inflation (10yr Treasury – 10yr TIPS)
Valuation Multiple	??	Shiller 10-Year Cyclically-Adjusted P/E (CAPE) Ratio
NOMINAL EXPECTED RETURN	5.7%	

Source: Research Affiliates, LLC based on data from Bloomberg.

U.S. Equities Priced at “Above Average” Valuations



Above average valuations in the face of tremendous uncertainty—re-regulation, deleveraging, protectionism, and deglobalization—isn’t compelling from a risk and reward standpoint.

Moving from current level of 20x back to historical average of 16x would be a 20% correction in equity markets

Source: Research Affiliates, LLC based upon data from Robert Shiller.

Future Valuation Expansion Not Promising

The only way to meet nominal expected returns of 8-10% for equities is for valuation multiples to rise.

Based on current valuation levels, that outlook is not promising.

Especially if we enter a reflationary environment that typically punishes valuation multiples.

Subsequent S&P 500 Index 10-Year Returns from Starting P/E Ratios of 20-22

	1928-1930	1936-1937	1960s	1992-1995
Subsequent 10-Year Return	-1.6%	6.1%	6.3%	10.6%
Subsequent 10-Year Inflation	-1.9%	3.7%	4.7%	2.4%
Ending P/E Ratio	13.4	15.5	14.3	25.2

Source: Research Affiliates, LLC based upon data from Morningstar and Robert Shiller.

B. Forward-Looking Expectations

What Did the “Naughts” Teach Us? Was it a Lost Decade?

Only For Investors Who Were
(1) Equity Centric and
(2) Cap-Weighted

Revisiting Core Principles

Conventional view: Stocks for the long run misconceptions

- "Stocks beat bonds by 5% a year over the very long run"
  - Historically predicated on higher yields than we've seen in 20 years
  - Largely fueled by falling dividend yields and rising PE ratios
  - Net of these effects historically would have seen half this, 2.5%
- "Stocks beat bonds for anyone willing to think long term"
- "Stocks loft from new high to new high with each new bull market"

The past 10 years has seen a massive revaluation of risk

- The 10-year ***realized*** "risk premium" has been negative
- Now prices are down and prospective rewards for risk-bearing up
- Are stocks yet priced to deliver a large risk premium again? No

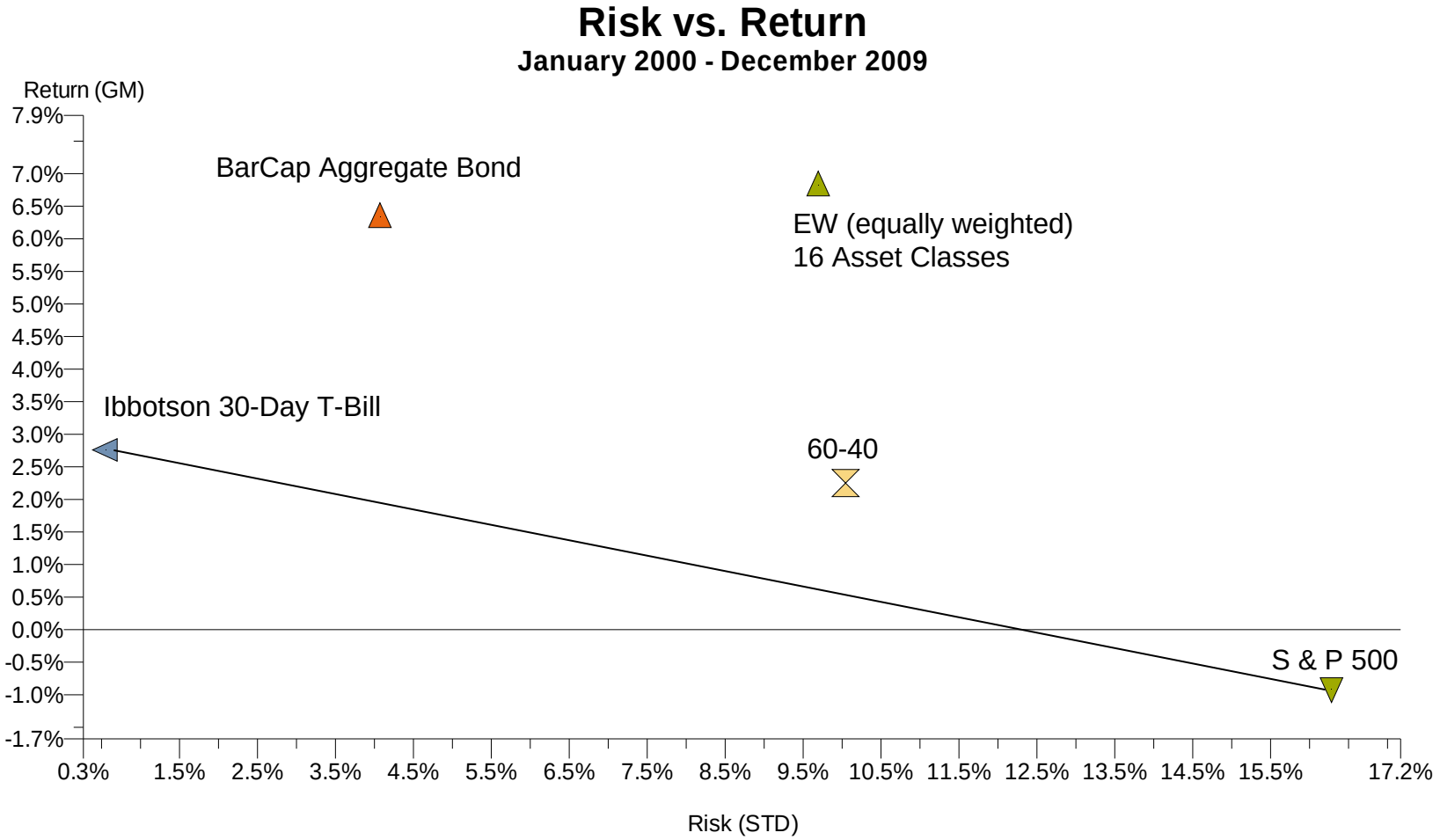
2000–2009: The Lost Decade?

	Asset Class	Benchmark	Dec 1999–Dec 2009 Annualized Return
Fixed Income	Emerging Market Bonds	JPM EMBI Plus	10.94%
	Emerging Local Currency	JPM ELMI+	8.46%
	TIPS	BarCap Gbl Infl Linked US TIPS	7.70%
	Long Treasury	BarCap US Treasury Long	7.59%
	Long Credit	BarCap US Long Credit	7.53%
	High-Yield Bonds	BarCap US Corporate High Yield	6.72%
	Core Bonds	BarCap US Agg Bond	6.33%
	Short-Term Bonds	ML US Corp&Govt 1-3 Yr	4.79%
	Bank Loans	Credit Suisse Leveraged Loan	4.30%
	Convertibles	ML Convertible Bonds All Qualities	3.30%
Asset Allocation	**Equally Weighted 16 Asset Classes**	**EW Asset Classes**	**6.83%**
	60/40	**60% S&P 500 / 40% BarCap Aggregate**	**2.25%**
Equities	Emerging Market Equities	MSCI Emerging Markets GR	10.09%
	Small Cap U.S. Equities	Russell 2000	3.51%
	Developed ex U.S. Equities	MSCI EAFE GR	1.58%
	Global Equity	MSCI AC World Index	0.89%
	Large Cap U.S. Equities	**S&P 500**	**-0.95%**
Other	REITs	FTSE NAREIT All REITs	10.19%
	Commodities	DJ UBS Commodity	7.13%
	U.S. Inflation	**IA SBBI U.S. Inflation**	**2.55%**

Notes:
All returns are total returns and are reported in USD.
Equally Weighted 16 Asset Classes consist of all of the benchmarks above except for 60/40 S&P/BarCap and MSCI AC World.
Equally Weighted 16 Asset Classes and 60% S&P/40% BarCap Aggregate returns assume monthly rebalancing.

Source: Research Affiliates, LLC., based on data from Morningstar Encorr and Bloomberg.

A Capital Market Line Inversion
(Why, Exactly, Do We Seek Equity-Like Returns at Bond-Like Risk?)



The Equally –weighted portfolio is comprised of the following indexes, rebalanced monthly. BoA ML US Corporate & Government 1-3 Year; BarCap US Aggregate Bond TR; BarCap US Treasury Long TR; BarCap US Long Credit TR; BarCap US Corporate High Yield TR; Credit Suisse Leveraged Loan; JPM EMBI + Composite TR; JPM ELMI + Composite; BoA ML Convertible Bonds All Qualities; BarCap Global Inflation Linked US TIPS TR; FTSE NAREIT All REITs TR; DJ AIG Commodity TR; S&P 500 TR; MSCI Emerging Markets TR; MSCI EAFE TR; Russell 2000 TR. The 60-40 portfolio is 60% S & P 500 TR and 40% BarCap Aggregate Bond TR rebalanced monthly. Past performance is no guarantee of future results.
Source: Barclays Capital, Merrill, JPMorgan, Russell, Credit Suisse, S&P, MSCI, Dow Jones, Bloomberg, Ibbotson

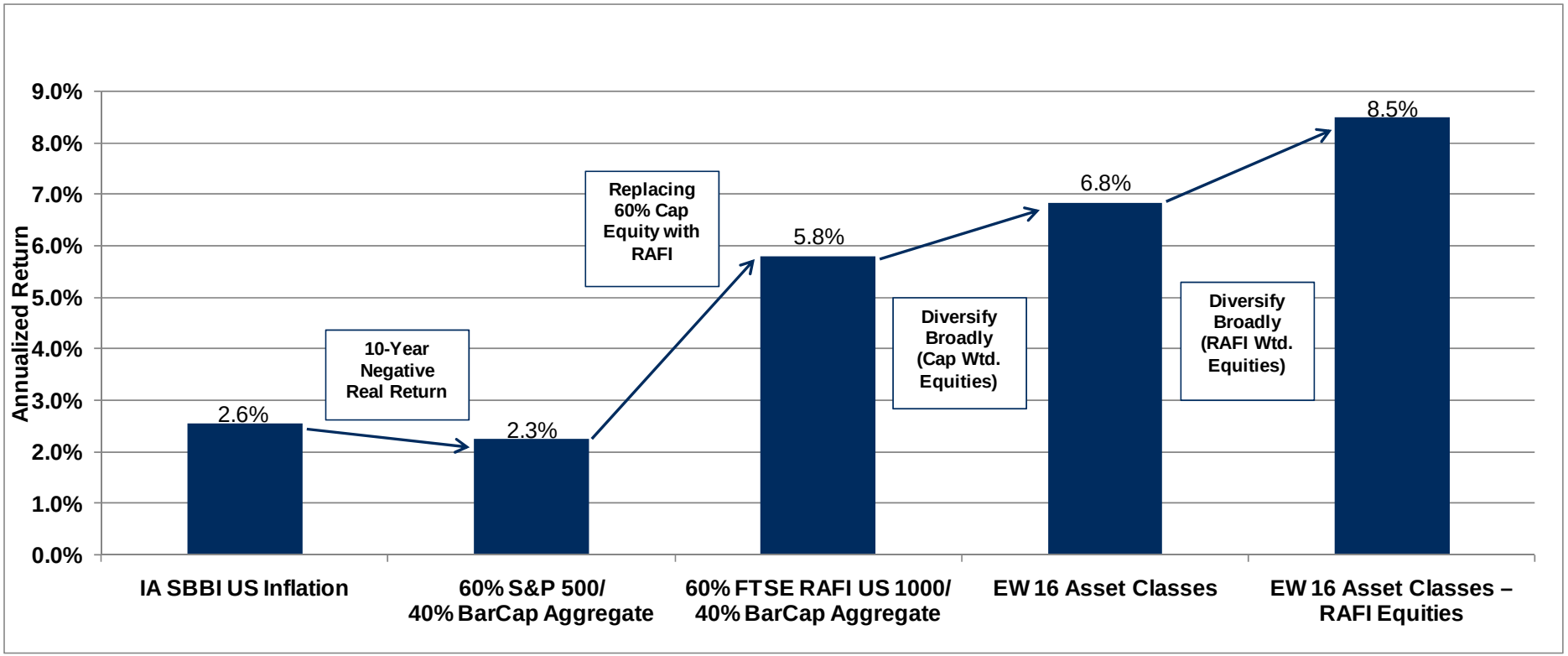
Price Indifferent Indexing vs. Cap Weight

Asset Class	Benchmark	2008	2009	Dec 1999–Dec 2009 Annualized Return
Global Fundamental Index	***FTSE RAFI All World 3000***	***-42.14%***	***46.61%***	***7.84%***
Global Equity	MSCI AC World Index	-41.85%	35.41%	0.89%
Equal Weight U.S. Equities	S&P Equal Weight Index	-39.72%	46.31%	5.14%
Large Company U.S. Fundamental Index	***FTSE RAFI US 1000***	***-39.99%***	***41.98%***	***4.74%***
Large Cap U.S. Equities	S&P 500	-36.99%	26.45%	-0.95%
Developed ex U.S. Fundamental Index	***FTSE RAFI Developed ex US 1000***	***-43.89%***	***44.05%***	***5.86%***
Developed ex U.S. Equities	MSCI EAFE GR	-43.06%	32.45%	1.58%
Emerging Market Fundamental Index	***FTSE RAFI Emerging Markets***	***-49.27%***	***81.88%***	***19.14%***
Emerging Market Equities	MSCI Emerging Markets GR	-53.17%	79.00%	10.09%

Note: All returns are total returns and are reported in USD.

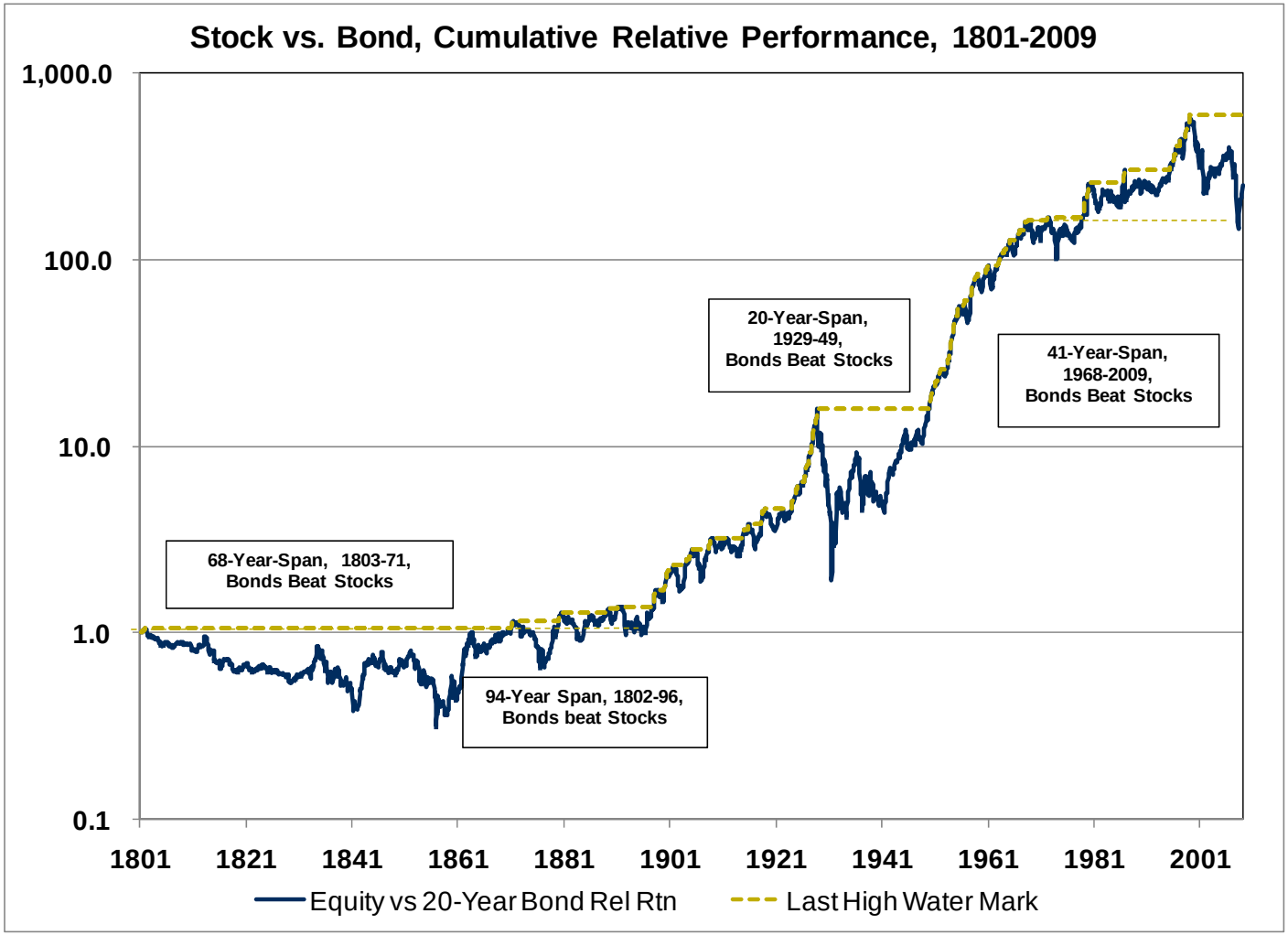
Source: Research Affiliates, LLC., based on data from Morningstar Encorr and Bloomberg.

Salvaging the Lost Decade … In Hindsight
December 31, 1999–December 31, 2009



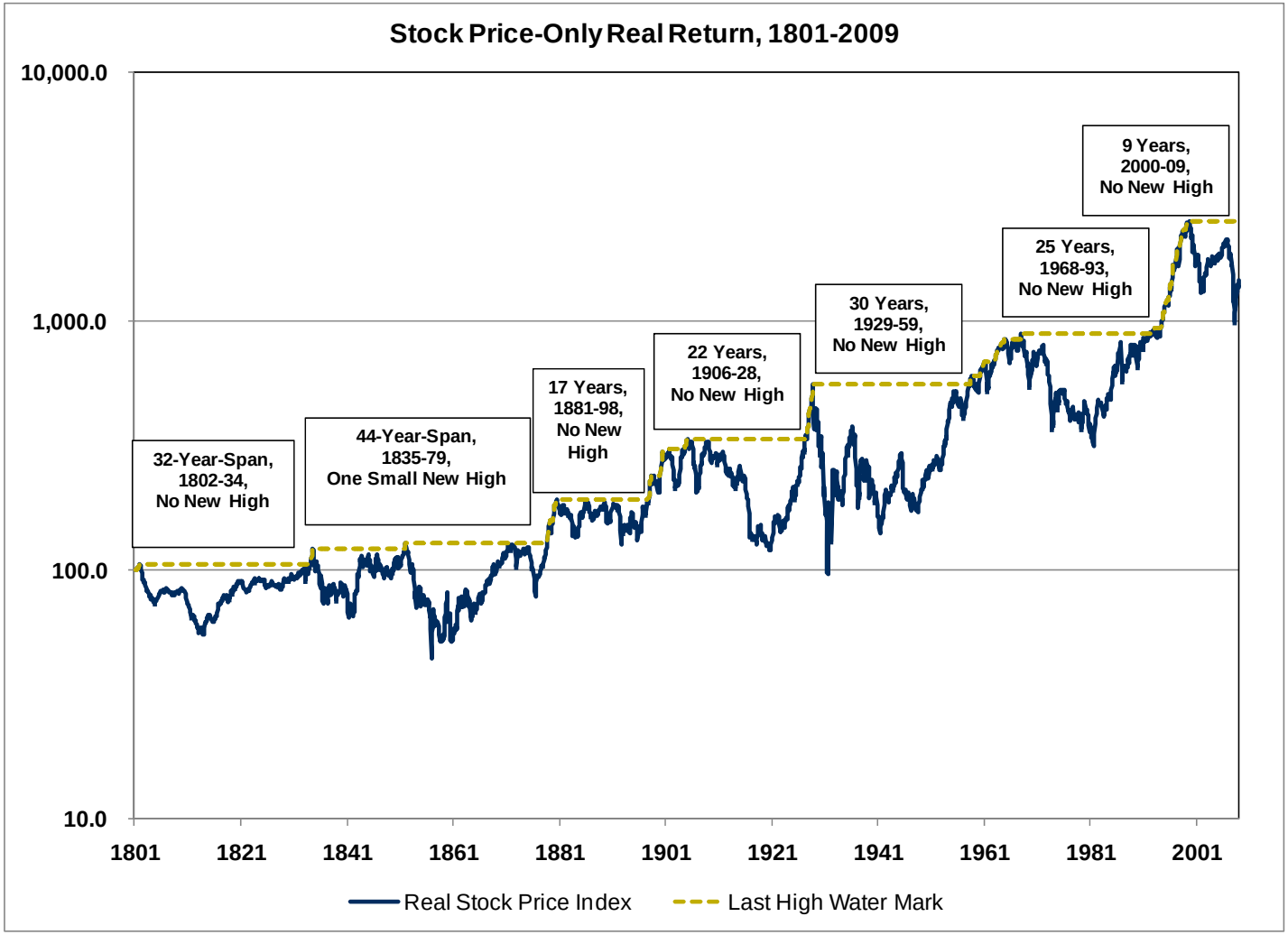
Source: Research Affiliates, LLC., based on data from Morningstar Encorr and Bloomberg.

Stocks for the Long Run?
How Long, Exactly, Do We Mean?



Source: Research Affiliates, LLC. Data provided by Bloomberg and Ibbotson. Equity data is an equally weighted composite of Schwert Equity Index (1800-1925), Ibbotson Equity Return (1926-2009) and FQ Equity Return (1871-1925). Bond data is an equally weighted composite of U.S. 10yr Bond Yield (1800-2009), 10Yr Yield-Global Financial Data (1871-2001), Ibbotson Bond Yield (1926-2009).

Over Past 207 Years, Droughts Over 10 Years Span 173 Years … Over 80% of Two Centuries



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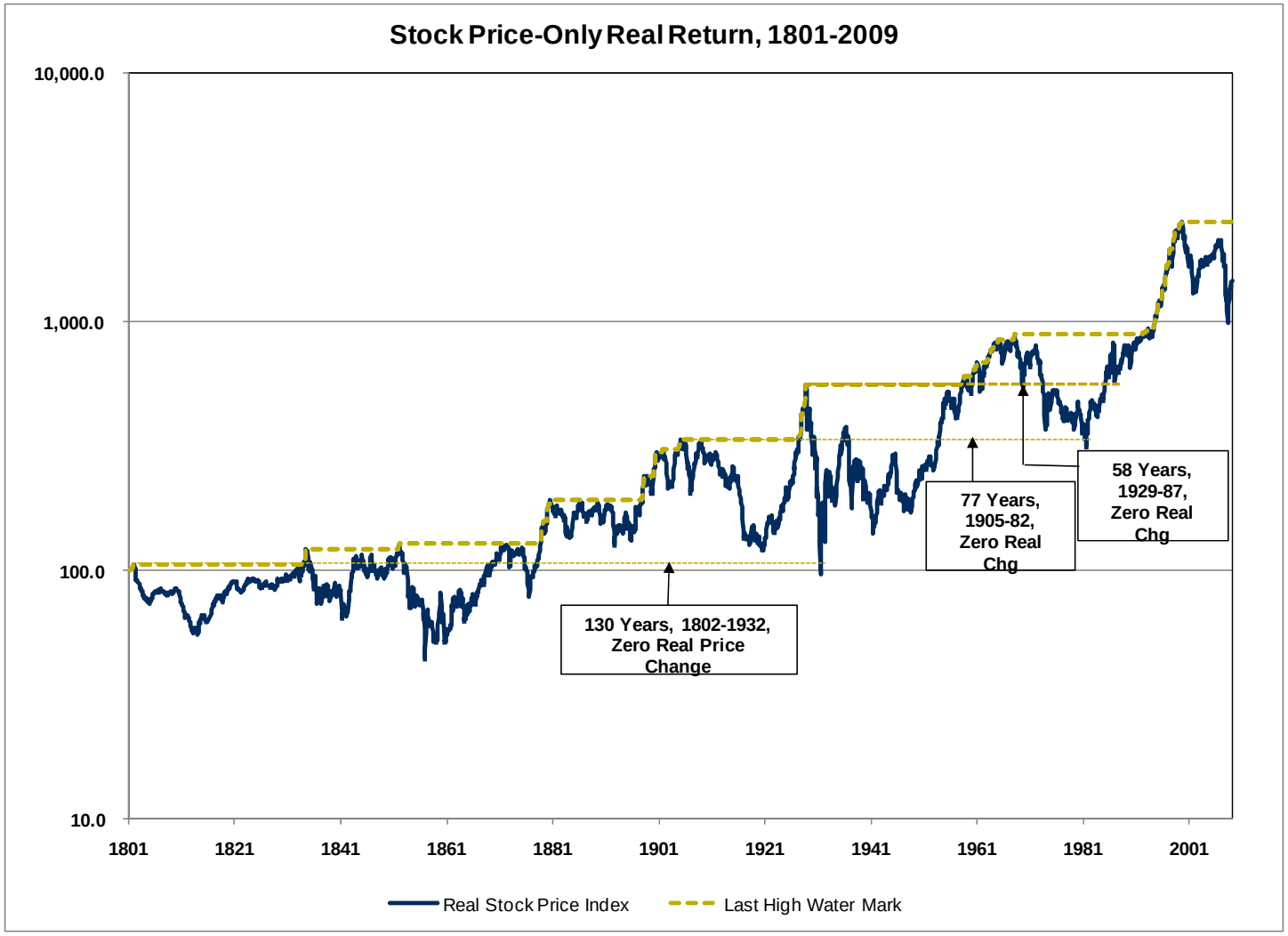
And Old Peaks May Be Tested for Decades More



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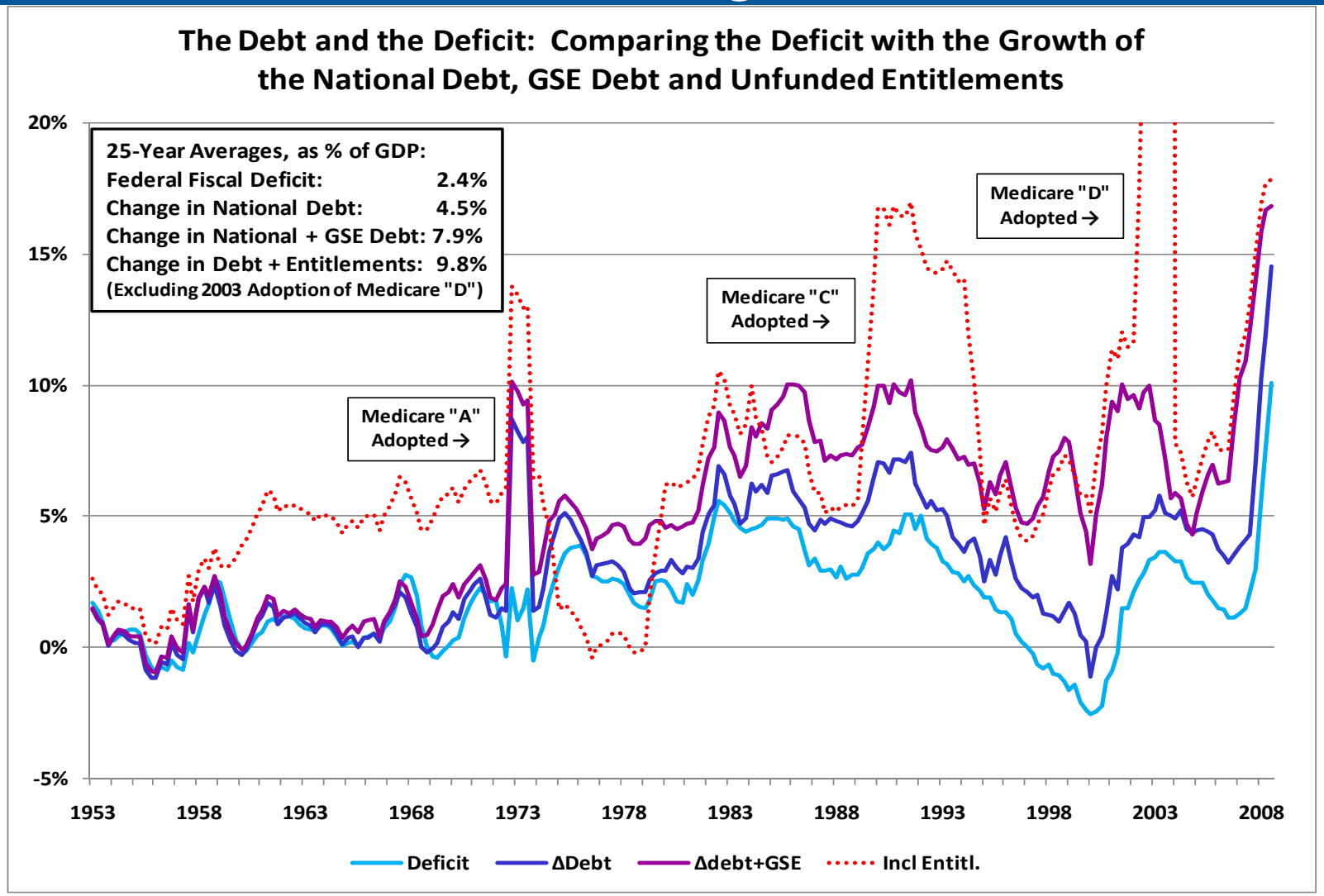
Looking to the Future

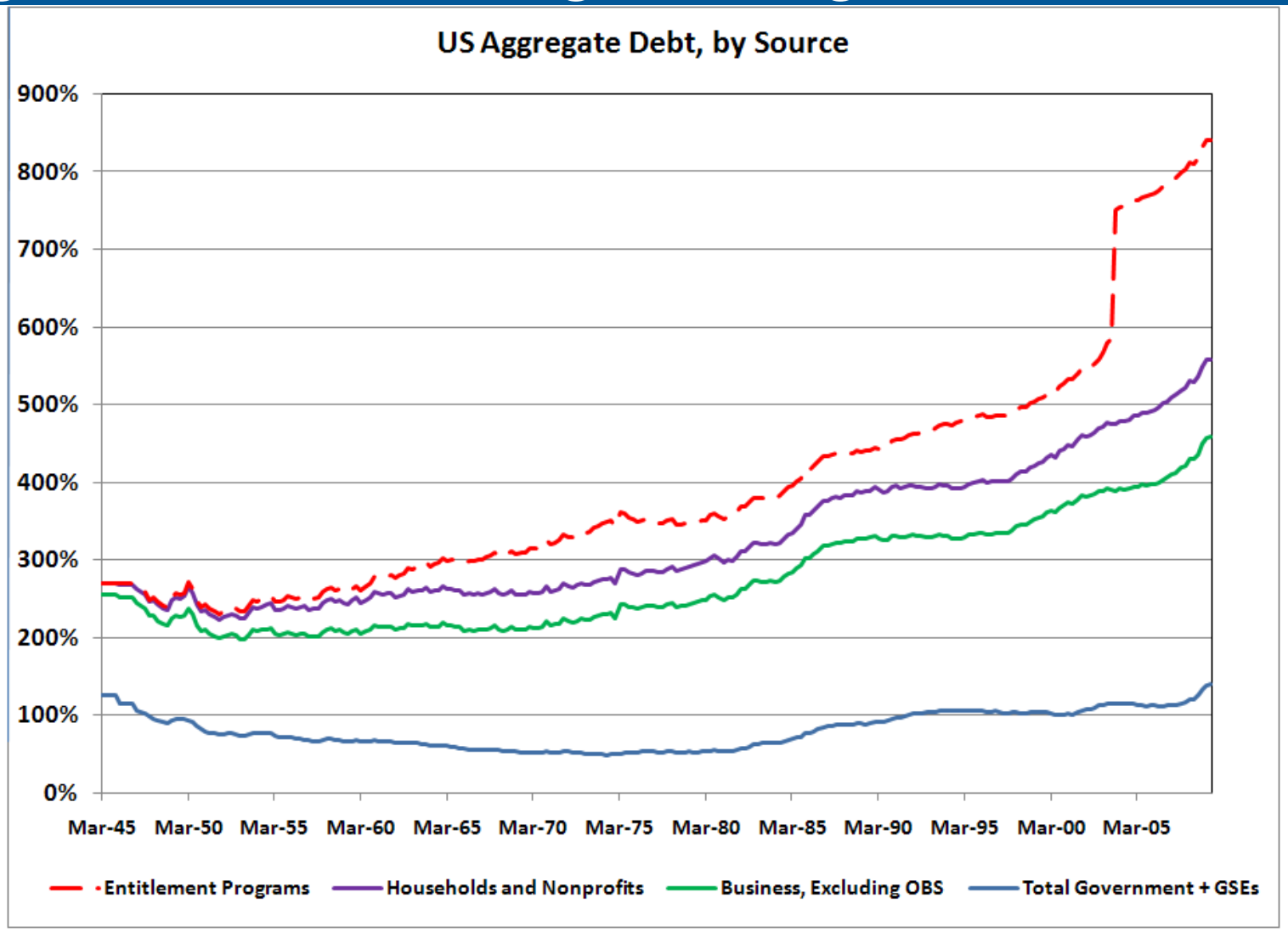
A 3-D Hurricane:
Our Deficit, Debt, and Demographics

Under GAAP Accounting, Our Fiscal Deficit is Far Larger Than it Seems



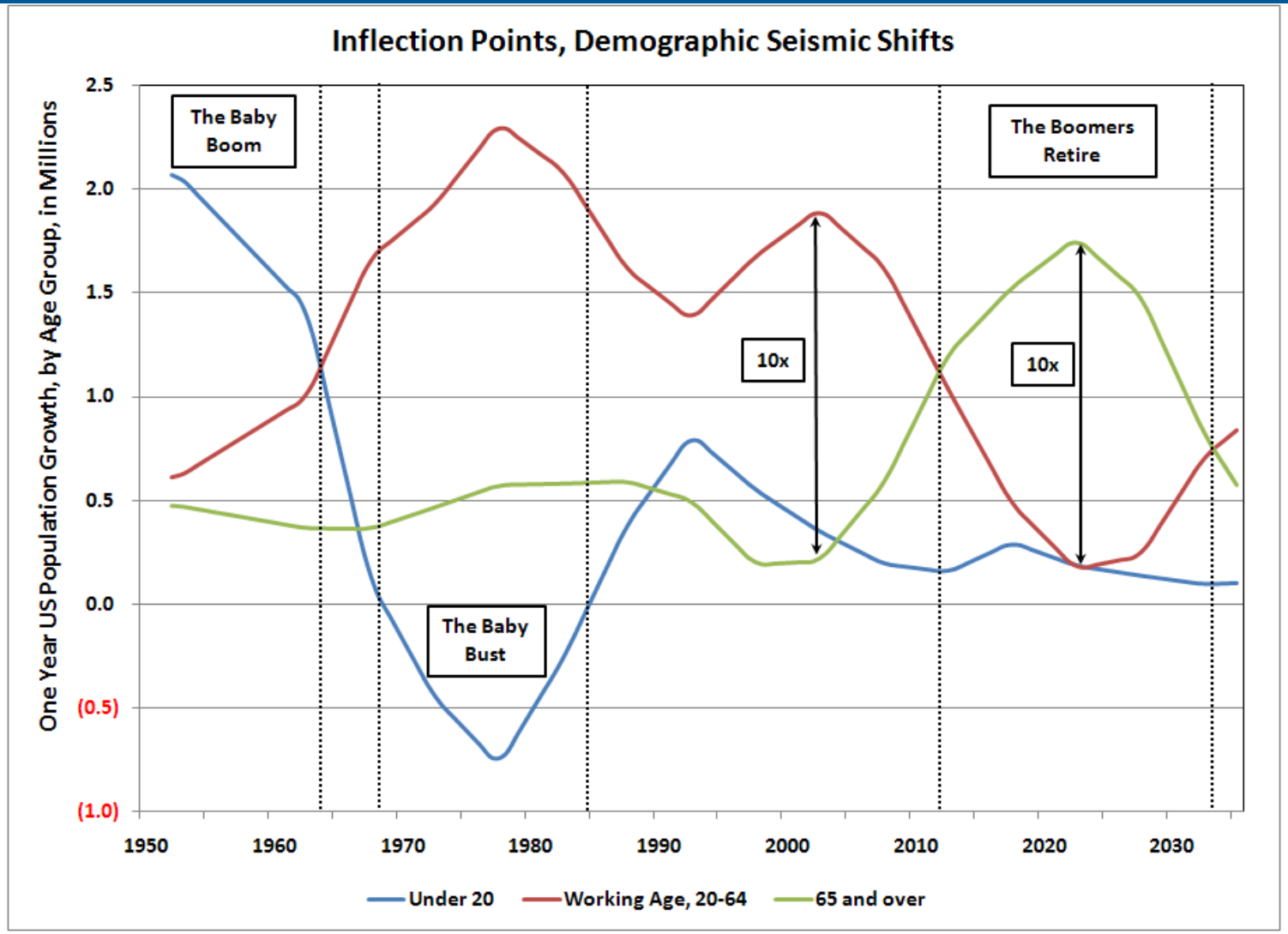
Source: Research Affiliates, LLC, based on data and projections from the US Treasury Department.

Public Debt, Total Debt and Entitlement Obligations are Growing at a Frightful Pace



Source: Research Affiliates, LLC, based on data from the US Federal Reserve Flow of Funds database and the US Social Security Administration.

And Demographics Won't Make This Any Easier in the Years Ahead



Source: Research Affiliates, LLC, based on population data and projections from the US Social Security Administration.

Investment Implications

If our debt burden is too large, choices are: Pay the debt, abrogate, or reflate

Which will our politicians choose?

- Inflation protection will be priced at a premium
- Retirees will be selling assets to a proportionally smaller pool of buyers
- Equities under pressure
- Opportunities in emerging markets

Where Are the Opportunities Today?

What We Expect Going Forward: More Choppy Times Ahead

A second dip in the economy are reasonably likely and are not reflected in current market conditions

- **Why? Government spending, based on borrowed funds, leads to a "sugar high" for the economy, and higher taxes are needed to pay for that spending**
- **When? The lapsing of the Bush Tax Cuts at year-end may precipitate a fall-off in consumer spending and serve as a catalyst for a renewed recession**
- **Fall off in spending would likely precede year-end, i.e. 4th Quarter 2010. The markets will see this coming, leading to some risks before year-end**

Outlook for Investors

Longer-term baseline expected returns for equities are moderate.

	Expected Return	Methodology
Dividend Yield	2.2%	Current Dividend Yield of S&P 500 Index
Real Earnings Growth	1.5%	100-year average (population and productivity growth)
Inflation	2.0%	10-year Breakeven Inflation (10yr Tsy – 10yr TIPS)
Valuation Multiple	??	Shiller 10-Year Cyclically-Adjusted P/E (CAPE) Ratio
NOMINAL EXPECTED RETURN	5.7%	

But there is always something that is attractive and the canny investor will see opportunity, not risk, in the resulting turbulence:

- **Now is the time for a defensive investment posture**
- **TIPS: Priced to reflect inflation of about 2.0% per year through 2030**
- **Deep Value stocks, including RAFI: Best valuation multiples relative to growth since 2000**
- **Emerging market bonds: Absent political risk, they are objectively a better credit risk than U.S. Treasuries, at higher yield**
- **Cap-weight has an immense drag, especially in more inefficient markets, e.g. emg mkts**

Source: Research Affiliates, LLC based on data from Bloomberg.

A Spectrum of Returns
"The First Shall Be Last and the Last Shall Be First"

	Cumulative Returns				1993–2009	
Asset Class	2008–2009	2003–2007	1998–2002	1993–1997	Standard Deviation	Correlation with 60–40
Emerging Markets Stocks	-16	391	-21	44	29	0.64
International Stocks	-25	171	-12	74	19	0.82
REITs	-22	131	23	118	23	0.56
Commodities	-23	95	21	58	17	0.15
Large Cap U.S. Stocks	-20	83	-3	152	17	0.99
Emerging Markets Bonds	14	82	44	—	9	0.68
High Yield Bonds	16	67	3	75	10	0.70
Convertibles	-4	66	20	92	15	0.86
Unhedged Foreign Bonds	16	43	27	47	9	0.00
TIPS	9	36	52	—	5	-0.13
Long Government Bonds	8	32	52	62	10	-0.18
Mortgages	15	25	43	42	3	-0.07
Core Bonds	11	24	44	43	4	0.00
Money Market	2	16	23	26	1	0.15

Red = worst three Blue = best three

Note: Emerging markets and TIPS standard deviations and correlations are for the 10 years ended September 2009.

Past performance is no guarantee of future results. 60-40 represents a composite of the S&P 500 (60%) and Lehman Brothers Government/Credit Bond Index (40%). Standard deviation is an absolute measure of volatility measuring dispersion about an average which, for an index, depicts how widely the returns varied over a certain period of time. The greater the degree of dispersion, the greater the risk. Correlation w/60-40 measures the correlation, or tendency to move in tandem, of the performance of the listed asset class with the 60/40 portfolio for the 15-year period ended 12/31/07. A higher number indicates a greater correlation. Emerging Markets Stocks represented by MSCI Emerging Markets Index. Commodities represented by Dow Jones AIG Commodity Index. REITS represented by Wilshire REIT Index. Emerging Markets Bonds represented by JP Morgan Emerging Markets Bond Index Global. TIPS represented by Lehman U.S. TIPS Index. High Yield Bonds represented by Merrill Lynch High Yield Master II Index. Long Term Govt Bonds represented by Lehman Brothers Long-Term Treasury Index. Mortgage Bonds represented by Lehman Brothers Mortgage. Convertible Bonds represented by Merrill Lynch ALL US Convertible Securities Index. Unhedged Foreign Bonds represented by Citigroup World ex-U.S. Government Bond Index. Money Markets represented by Citigroup 3-Month T-Bill Index. Intl Stocks represented by MSCI EAFE Index. S&P 500 Equal Weighted (SPEW) reflects the performance of the S&P 500 Index with component stocks equally weighted rather than capitalization weighted. The Standard & Poor's 500 Stock Index (S&P 500) is an unmanaged, capitalization-weighted index of U.S. companies generally representative of the U.S. Stock Market. The Lehman Aggregate Bond Index is generally considered to be representative of the domestic, investment-grade, fixed-rate, taxable bond market. Returns are not indicative of the past or future performance of any investment product.

Three Paths to Improved Return Potential

Consider Other Asset Classes

- Stocks and bonds are not the only choices
- Unconventional assets can be priced to offer better returns

Seek Alpha

- Conservatively, focusing on avoiding negative alpha, or
- Aggressively, if you have confidence in the opportunities

Actively Manage the Asset Mix

- *Include* alternative markets in these decisions
- Seek assets which are out of favor, priced for better returns

We Believe All Three Paths Can Be Pursued in Parallel!

Our fourth alternative–leverage–boosts risk far more than it improves prospective returns

C. Plan Funded Ratios

Funded Ratios are Lower Than They Seem

Average Return Assumption of State Defined Benefit Plans: 7.94%

Current Funded Ratio of Public DB Plans: 84%

- **Total amount of assets: $2.6 trillion**
- **Total amount of liabilites: $3.1 trillion**

What would liabilities be if used a "real" discount rate off the Treasury curve?

- **Using 4.35% that can be locked-in on the Treasury yield curve (2040 STRIP)**
- **Liabilities are actually $5.2 trillion**
- **And public DB plans are only half (51%) funded!**

Currently, the $2.1 trillion of liabilities above the "risk free" rate are presumed to come from contributions (difficult in today's stretched state and local budgets) and investment successes from risky assets

And these statistics do not take into consideration unfunded non-pension benefits (primarily promised post-retirement health care)

Source: Research Affiliates, LLC based on data from Pew Center on the States, and NCPA.

The World We Live In

New Accounting Rules are Moving Us to the "Real World"

Tracking Error to Passive Benchmarks or Peers is Irrelevant…Outside of Maverick Risk

Low Prospective Asset Class Returns Make Liability Defeasement More Feasible…If you can earn similar nominal returns

Mother of All Recoveries Leads to Paltry Expected Returns (as of June 2010)

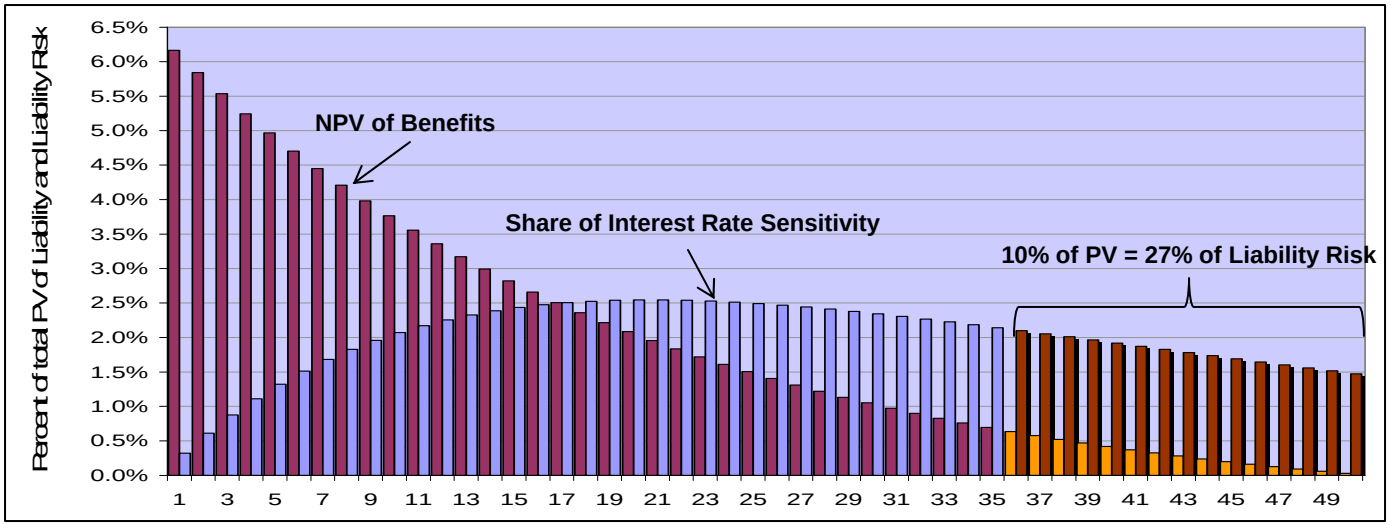
	Expected Return	Methodology	Standard Deviation	Tracking Error to Liabilities
US Equities	5.7%	Curr Div Yld (2.2%) + 100-yr Real Earn Gr (1.5%) + BE10-yr Inflation (2.0%)	16%	23%
Core Fixed Income	2.5%	Current YTM of Barcap Aggregate	5%	10%
Alternatives	6%	HFRI HFOF Index (3.3% 10 year return)	8%	15%
LDI Traditional Approaches:				
Strips/Zeroes	4.5%	YTM of Citi Strips	21%	3%
Long Credit	5.5%	YTM of Barcap US Long Credit A	16%	16%
Long Treasury	4%	YTM of Barcap US Treasury 20+ Year	15%	10%

Traditional LDI strategies provide similar forward-looking returns to mainstream asset classes, but <u>all</u> fall short of targeted actuarial assumed rate of return.

Source: Research Affiliates, LLC., based on data from Bloomberg.

The Tail That Wags the Dog

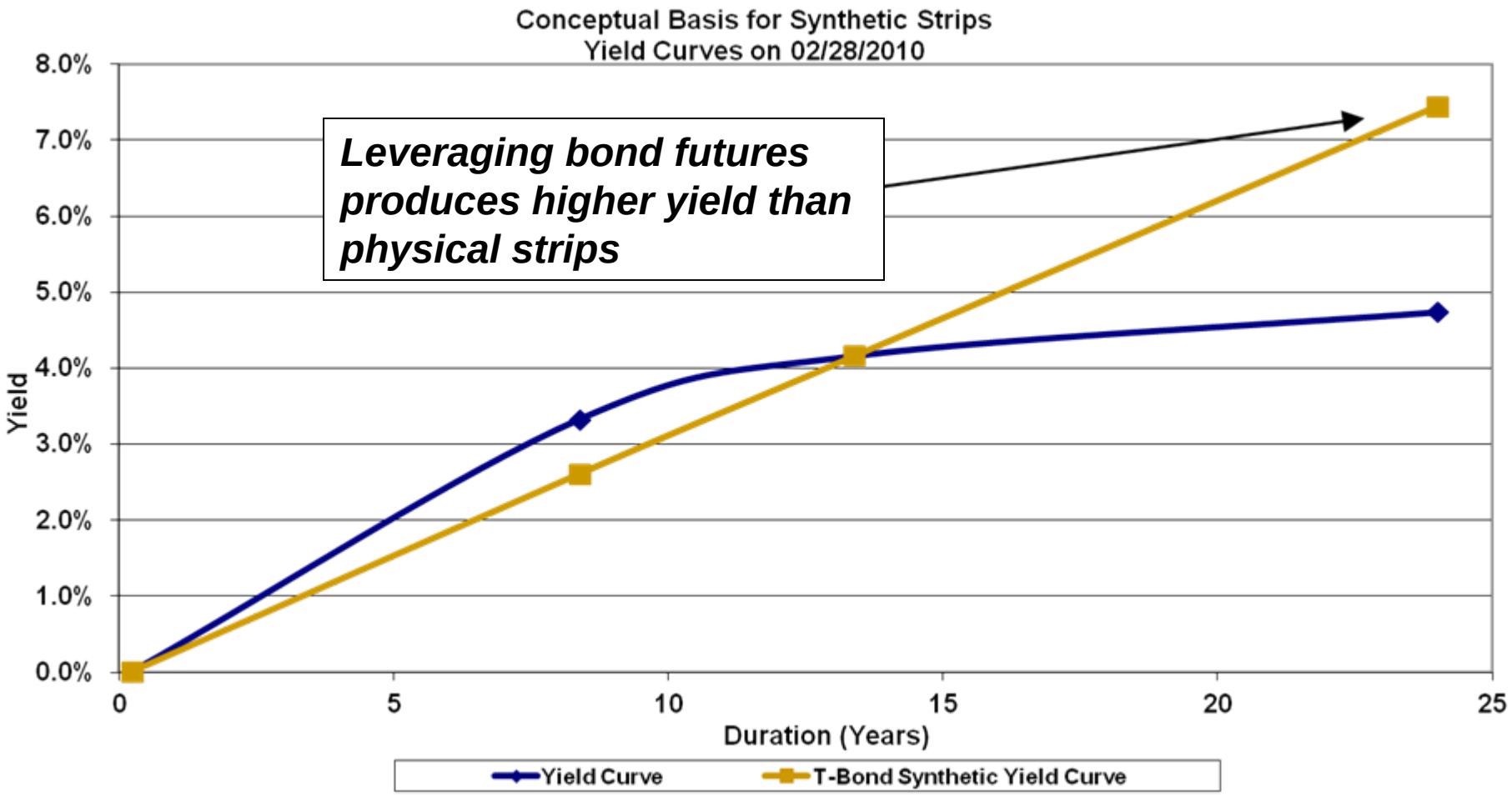
Just 10% of Present Value Equals 27% of Interest Rate Risk



Can we defease these ultra long-term liabilities while preserving LTROA Assumption of ~8%? Otherwise, the "Japan Scenario" can be crippling.

Source: Research Affiliates, LLC.

Conceptual Basis for Synthetic Strips



Source: Research Affiliates, LLC.

D. Concluding Thoughts and Questions

CalPERS – Research Affiliates

Thank you for your time!

E. Appendix

Research Papers

Asset Allocation Research Papers

1. Surprise! Higher Dividends = Higher Earnings Growth (**Arnott** and Asness, *Financial Analysts Journal* , 2003)
2. What Risk Premium is "Normal"? (**Arnott** and Bernstein, *Financial Analysts Journal* , 2002)
3. Demographics and Capital Market Returns (**Arnott** and Casscells, *Financial Analysts Journal* , 2003)
4. Cyclicality in Stock Market Volatility and Optimal Portfolio Allocation (**Hsu** and **Li**, in *Stock Market Volatility* , 2009)
5. Model Risk for Market Risk Modeling (**Hsu**, **Kalesnik,** and **Shepherd**, in *The Risk Modeling Evaluation Handbook* , 2010)
6. Shadow Banks and the Financial Crisis of 2007-2008 (**Hsu** and **Moroz**, in *The Banking Crisis Handbook* , 2010)
7. The Equity Premium Revisited (Cornell and **Moroz**, *Journal of Portfolio Management* , 2010)
8. Replacement Cost and REIT Pricing (**Hsu**, **Kalesnik,** and **Li**, *RA Working Paper* , 2009)
9. Fed Fund Policy and Stock Market Reaction (**Hsu**, **Little,** and **Shepherd**, *RA Working Paper* , 2009)

Fixed Income Research Papers

1. Valuation-Indifferent Indexing for Bonds (**Arnott**, **Hsu**, **Li,** and **Shepherd**, *Journal of Portfolio Management* , 2010)
2. Bonds, Why Bother? (**Arnott**, *Journal of Indexes* , 2009)
3. A Structural Model of Default Risk (**Hsu**, Saa-Requejo, and Santa-Clara, *Journal of Fixed Income* , 2010)
4. The Cross-section of Corporate Bonds (Ang, **Hsu,** and **Shepherd**, *RA Working Paper* , 2010)

Fundamental Index Papers

1. Fundamental Indexation (**Arnott**, **Hsu,** and Moore, *Financial Analysts Journal* , 2005)
2. Can Noise Create the Size and Value Effects (**Arnott**, **Hsu**, **Liu,** and Markowitz, *RA Working Paper* , 2009)
3. Clairvoyant Value II: the Growth/Value Cycle (**Arnott**, **Li,** and **Sherrerd**, *Journal of Portfolio Management* , 2009)
4. Clairvoyant Value and the Value Effect (**Arnott**, **Li,** and **Sherrerd,** *Journal of Portfolio Management* , 2009)
5. Beyond Cap Weighting (**Arnott**, **Kalesnik**, Moghtadar, and Scholl, *Journal of Indexes* , 2010)
6. Cap-Weighted Portfolios are Sub-Optimal Portfolios (**Hsu**, *Journal of Investment Management* , 2006)
7. Dollar Cost Averaging (Brennan, **Li,** and Torous, *Review of Finance* , 2005)
8. Agency and Asset Pricing (Brennan and **Li**, *RA Working Paper* , 2009)
9. Predicting the Mean and the Volatility of Value Premium (**Viswanathan**, *Journal of Intl Finance and Economics* , 2009)

Pension Management Papers

1. Managing Investments for the Long Term (**Arnott**, *Financial Analysts Journal* , 2003)
2. The Policy Portfolio Problem (**Arnott**, *Financial Analysts Journal* , 2004)

Important Information

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